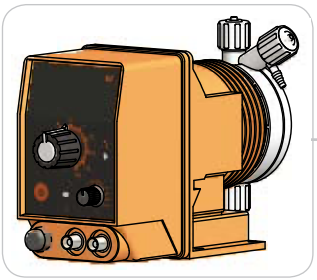
This operating instructions contains safety information that if ignored can endanger life or result in serious injury. They are indicated by this icon.

Use of this pump with radioactive chemicals is forbidden!

Keep the pump protected from sun and water.
Avoid water splashes.



OPERATING INSTRUCTIONS MANUAL FOR “K” DOSING PUMP

Read Carefully !

CE

ENGLISH Version

R1-04-08

“K” series solenoid dosing pumps comply with the following European regulations:

EN60335-1 : 1995, EN55014, EN50081-1/2, EN50082-1/2, EN6055-2, EN60555,3

Based on directive CEE 73/23 c 93/68 (DBT Low voltage directive) and directive 89/336/ CEE (EMC Electromagnetic Compatibility)

GENERAL SAFETY GUIDELINES

Danger! In emergencies the pump should be switched off immediately! Disconnect the power cable from the power supply!

When using pump with aggressive chemicals observe the regulations concerning the transport and storage of aggressive fluids!

When installing always observe national regulations!

Manufacturer is not liable for any unauthorized use or misuse of this product that may cause injury, damage to persons or materials.

Caution! Pump must be accessible at all times for both operating and servicing. Access must not be obstructed in any way!

Feeder should be interlocked with a no-flow protection device.

Pump and accessories must be serviced and repaired by qualified and authorized personnel only!

Always discharge the liquid end before servicing the pump!

Empty and rinse the liquid end before work on a pump which has been used with hazardous or unknown chemicals!

Always read chemical safety datasheet!

Always wear protective clothing when handling hazardous or unknown chemicals!

Introduction:

Metering Pumps “K” Series are the ideal solution for low / middle dosing of chemicals. All control and setup parameters are available through knobs and a visual system (led). Metering Pumps “K” Series have got an On/Off digital switch for ensure dosing activity (available only for some models).

Pump’s capacity

Flow rate is determined by the stroke length and by the stroke speed. The stroke length is adjustable from 0 to 100% using the stroke length adjustment knob. However dosing accuracy is guarantee within an adjustment range from 30% to 100%. The led on the frontal panel shows the activity status of the pump.

Models:

KCO Constant pump with stroke speed (frequency) adjustment

KCL Constant pump with level control, stroke speed (frequency) adjustment

KIS Constant-proportional pump driven by external digital signal with level control: to each external pulse correspond one pump stroke

KPV Constant-proportional pump driven by external digital signal with pulse divider mode (ratio 1 to 1000) and level control

KPVM Constant-proportional pump driven by external digital signal, level control , with pulse divider mode (ratio 1 to 100) and multiplier mode (ratio 1 to 10)

KIC Constant-proportional pump driven by current signal (0/4mA = 0 pulses; 20mA = max pulses) and level control

Capacity:

Pressure *bar*	Flow *l/h*
20	01
18	02
15	04
10	05
08	08
05	10
02	18

Self venting capacity:

Pressure *bar*	Flow *l/h*
18	01
15	03
10	3.5
08	5.5
05	7.5
02	13

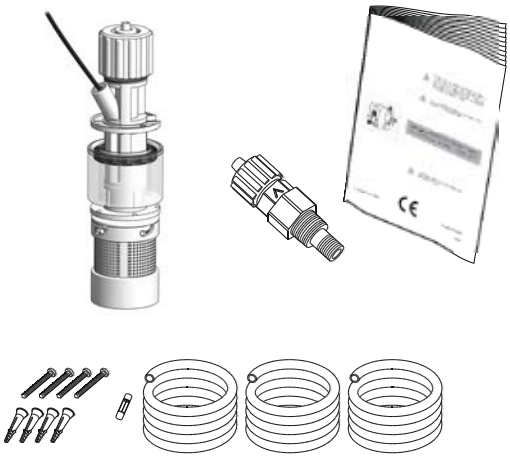
2. Unpacking

Included into package:

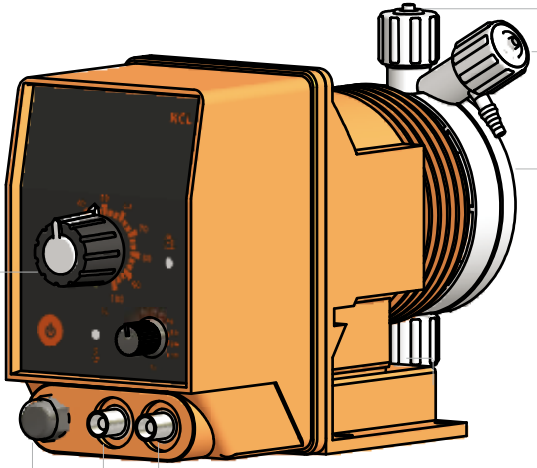
n.4	Dibbles ø6
n.4	Self tapping screws 4,5 x 40
n.1	Fuse
n.1	Foot filter with valve
n.1	Injection valve
n.1	Level probe
m 2	Delivery pipe* (PVDF)
m 2	Suction pipe * (transparent PVC)
m 2	Discharge pipe (transparent PVC)
n.1	This installation manual

* If hose is 6x8 there is only a 4meters long hose. Cut to obtain suction and delivery hoses.

Remove the contents from the box.



PLEASE DO NOT TRASH PACKAGING.
IT CAN BE USED TO RETURN THE PUMP.



* *Press to turn.*
To avoid pump's damage, turn the knob when the pump is on.

4. Before to Install warnings

Pump's installation and operativity is made in 4 main steps:

Pump's installation
Hydraulic Installation (hoses, level probe, injection valve)
Electrical Installation (main power connection, priming)
Programming the pump.

Before to start, please read carefully the following safety information.

Protective clothes

Wear always protective clothes as masks, gloves, safety glasses and qfurther security devices during ALL installation procedure and while handling chemicals.

Installation location

Pump must be installed in a safety place and fixed to the table / wall to avoid vibration problems!

Pump must be installed in a easy accessible place!

Pump must be installed in horizontal position!

Avoid water splashes and direct sun!

Hoses and Valves

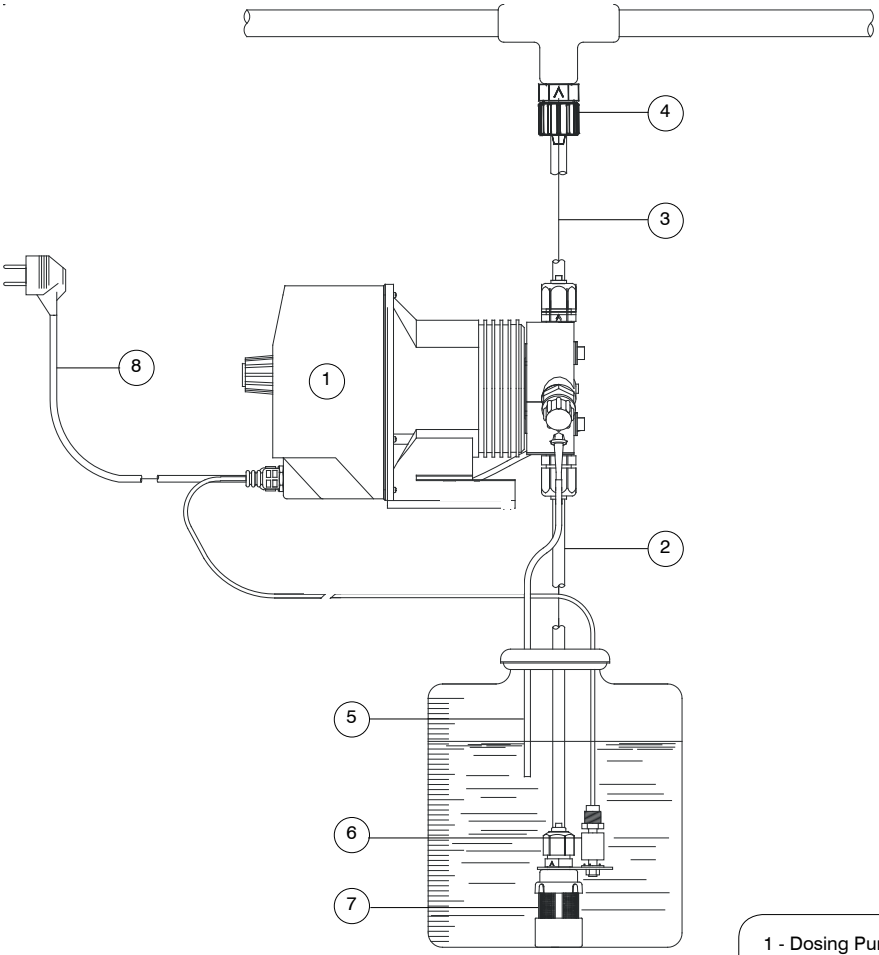
Suction and delivery hoses must be installed in horizontal position! All hoses connections must be performed using only hands' force! No tongs required!

Delivery hose must be firmly fixed to avoid suddenly movements that could damage near objects!

Suction hose must be shorter as possible and installed in vertical position to avoid air bubbles suction!

Use only hoses compatibles with product to dose! See Chemical Compatibility Table. If dosing product is not listed please consult full compatibility table or contact chemical's manufacturer!

Pump must be installed in a stable support (for example a table) at a maximum height (**from tank's bottom**) of **1,5 meters**.



1 - Dosing Pump
2 - Suction Hose
3 - Delivery Hose
4 - Injection Valve
5 - Air discharge
6 - Level Probe
7 - Foot Filter
8 - Power Cable

6. Hydraulic Installation

Hydraulic connections are:

Suction Hose with level probe and foot filter
Delivery Hose with injection valve
Discharge Hose

Suction Hose.

Completely unscrew tightening nut from pump's head and remove assembling components: *tightening nut, holding ring and pipe holder.*

Assembly as shown in fig. (A). Insert hose into pipe holder until it reaches the bottom.

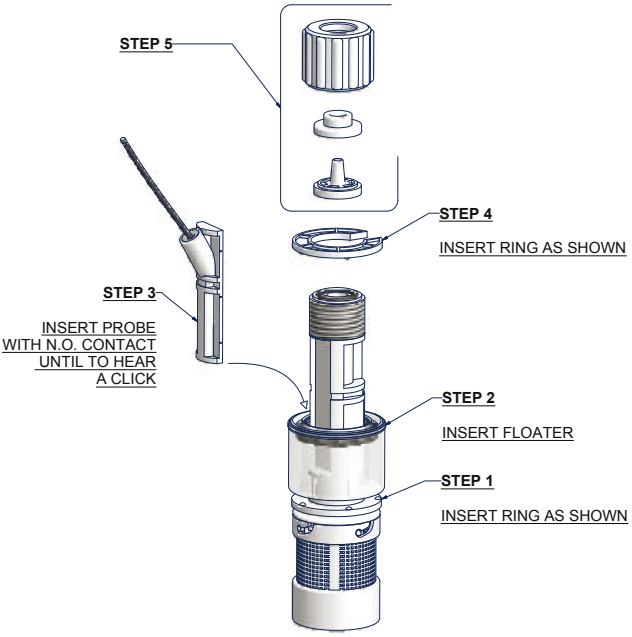
Lock hose on pump's head by screwing down the tightening nut.
Use only hands to do it!

Connect other side of the hose to the foot filter using the same procedure.

fig. (A)

Assembling foot filter with level probe.

Level probe must be assembled with foot filter using the provided kit.
Foot valve is made to be installed into tank's bottom without sediments priming problem.



Connect BNC from level probe into pump's level input (front side of the pump).
Put level probe assembled with foot filter into tank's bottom.

Warning: If there is a mixer installed into tank, install a suction lance instead of level probe / foot filter.

Delivery Hose.

Completely unscrew tightening nut from pump's head and remove assembling components: *tightening nut, holding ring and pipe holder.*

Assembly as shown in fig. (A). Insert hose into pipe holder until it reaches the bottom.

Lock hose on pump's head by screwing down the tightening nut.
Use only hands to do it!

Connect other side of the hose to the injection valve using the same procedure.

6. Hydraulic Installation

Injection Valve.

Injection valve must be installed on plant from water's input.
Injection valve will open at pressure greater than 0,3bar.

Dicharge hose.

Insert one side of discharge hose into discharge connector as shown in fig (C).

Insert other side of discharge hose into product's tank.
During priming procedure product exceeding will flow into tank.

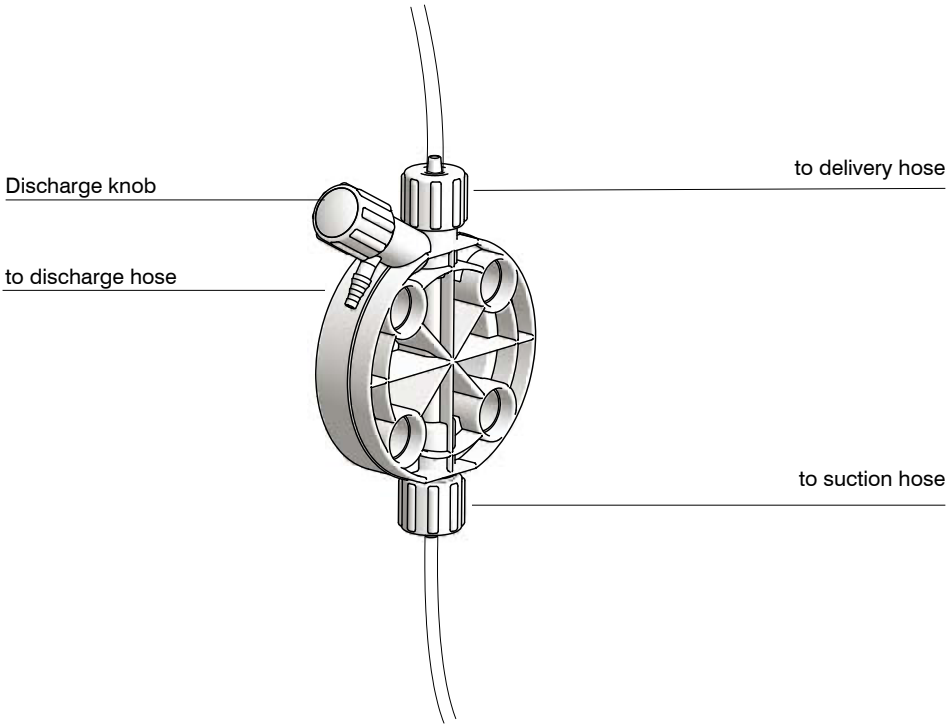
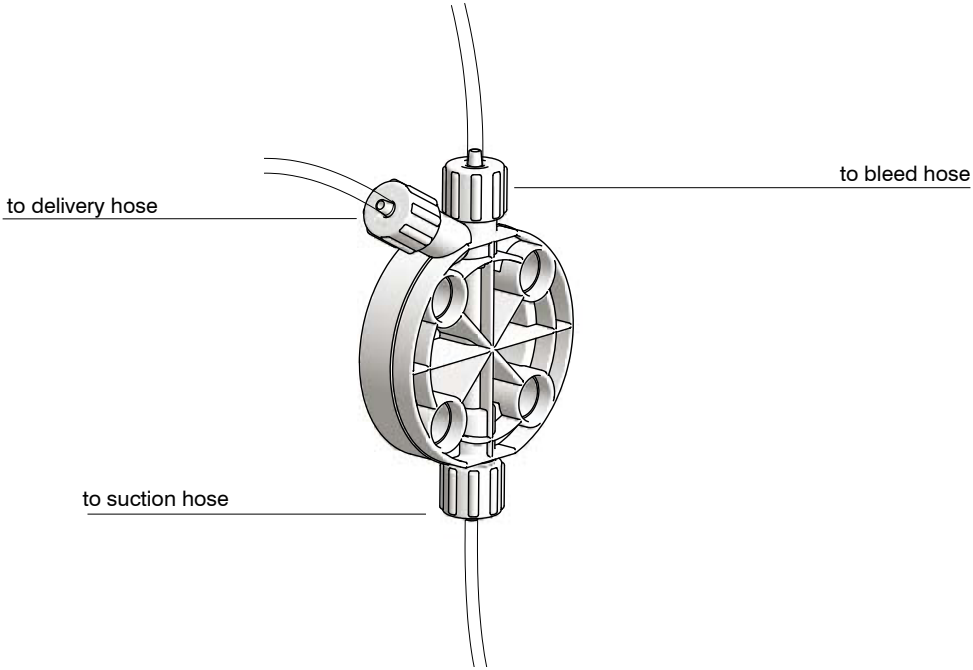


fig (C)

For priming procedure see the paragraph "Priming".

Self-venting pump head.



Self-venting pump head must be used when using chemicals that produce gas (i.e. hydrogen peroxide, ammonium, sodium hypoclorite at particular conditions).

Hoses assembling procedure (*including purge hose*) is described in fig. (A).

Notes:

- suction, delivery and purge valves are DIFFERENT! Do not exchange them!

- delivery and purge hoses are made of same material!

- it's allowed to lightly bend discharge hose!

- during calibration procedure ("TEST") insert discharge hose into BECKER test-tube!

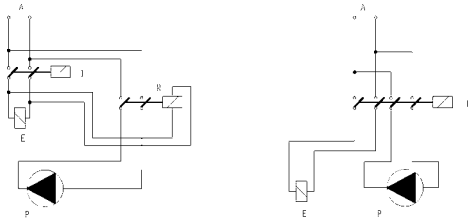
7. Electrical Installation

All electrical connections must be performed by **AUTHORIZED AND QUALIFIED** personnel only. Before to proceed, please, verify the following steps:

- verify that pump's label values are compatible with main power supply.

- pump must be connected to a plant with a differential switch (0,03A sensitivity) if there isn't a good ground.

- to avoid damages to the pump do not install it in parallel with heavy inductance load (for example: engines). A relay switch must be used. See below picture.

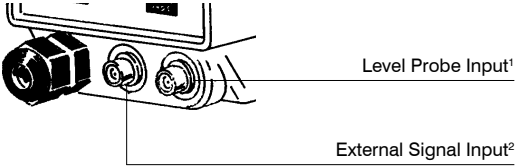


P *- Dosing Pump*
R *- Relay*
I *- Switch or safety device*
E *- Electrovalve or inductance load*
A *- Main Power*

Once verified previous steps proceed as follows:

- check that “BNC” of level probe has been connected as described in “Hydraulic Installation” chapter.

- connect “BNC” and external signal to pump’s “INPUT” connectors.



[1] *Level probe input available on models: KIC, KIS, KPV, KPVM, KCL*
[2] *External signal input available on models: KIC, KIS, KPV, KPVM*

8. Models

LEVEL ALARM

CL, IS, IC, PV and PVM type pump are provided with a liquid level alarm to indicate product tank is empty. The level probe is connected to the right BNC plug on pump's bottom panel. The level probe is made of a N.O. reed contact (10VA, 1A max., 230Vac max.) closed by a floating magnet housed in a (PP) plastic box. When the product level goes below the minimum the magnet closes the reed contact. The pump stops and the red LED on pump's front panel indicates the alarm status.

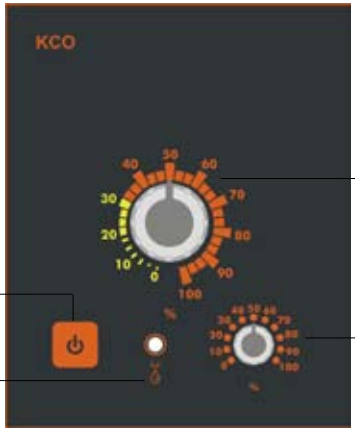
PUMP TYPES

Pumps mod. "KCL" (12-24 Vac/Vdc), "KIC", "KIS", "KPV" and "KPVM" are equipped with a bicolour led.
Led on, red colour: low level product alarm. Check product's tank and restore the level.
Led on, blinking green colour: pump normal operating mode.
Led on, blinking green colour (one second on, one second off): power supply out of range. Check pump's label and check the main power.

KCO

Constant dosing pump with stroke speed adjustment between 0 and 100% of indicated capacity (see label on pump type). The % marked knob sets the pump capacity, changing linearly the magnet stroke number per minute. It is strongly suggested to not operate the pump in the range from 0 to 10%, since there is not a linear correlation with the pump stroke speed in that range. This pump is specially designed for constant dosing rates. KCO pump can be ON/OFF driven by a LPH or a LCD instrument. To set 2.5 l/h against 5 bar on a KCO 0505 the % marked knob should be set to 50%.

KCO has a divider (x- 0,1) to reduce by ten times the pump capacity by dividing the pump stroke speed.
How to enable “divider mode”:
- set the pump into OFF* mode;
- keeping pressed the on/off button, wait 3 flashes from the status led. The pump will start the dosing activity with the stroke speed reduced ten times than the value set on stroke lenght knob.
To disable the “divider mode”, power OFF the pump. Keeping pressed the on/off button, wait 3 flashes of the status led.



LED
The led on the frontal panel shows the pump’s operating status through 5 flashing:

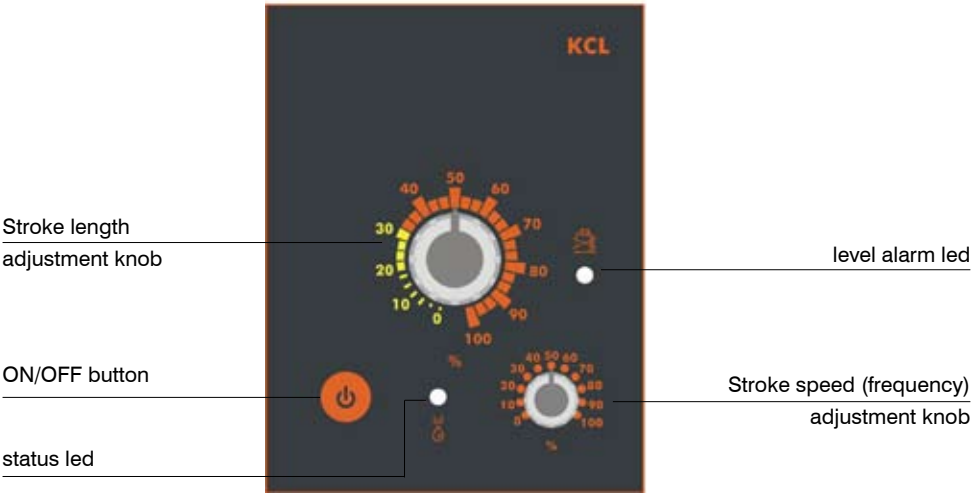
LED ACTIVITY	PUMP’S STATUS
It flashes 3 times per second	the pump is powered with a power supply lower than the label
It flashes 2 times per second	the pump is powered with a power supply higher than the label
It flashes 1 time every 2 seconds	the pump is in pause (OFF) and it is powered (OFF* mode)
led ON, it switches off when pump strokes	the pump is active and functioning (ON)
led ON, it switches off 1 time every 2 seconds	the pump is working into DIVIDE mode

8. Models

kCL

Constant dosing pump with *level alarm*, provided with a floating magnetic sensor probe.
A red led indicates that the pump stopped dosing because the product tank is empty.
This pump has stroke speed adjustment between 0 and 100% of indicated capacity (see label on pump type).
The % marked knob sets the pump capacity, changing linearly the magnet stroke number per minute.
It is strongly suggested to not operate the pump in the range from 0 to 10%, since there is not a linear correlation with the pump stroke speed in that range.

kCL has a divider (x- 0,1) to reduce by ten times the pump capacity by dividing the pump stroke speed.
How to enable “divider mode”:
- set the pump into OFF* mode;
- keeping pressed the on/off button, wait 3 flashes from the status led. The pump will start the dosing activity with the stroke speed reduced ten times than the value set on stroke lenght knob.
To disable the “divider mode”, power OFF the pump. Keeping pressed the on/off button, wait 3 flashes of the status led.



LED
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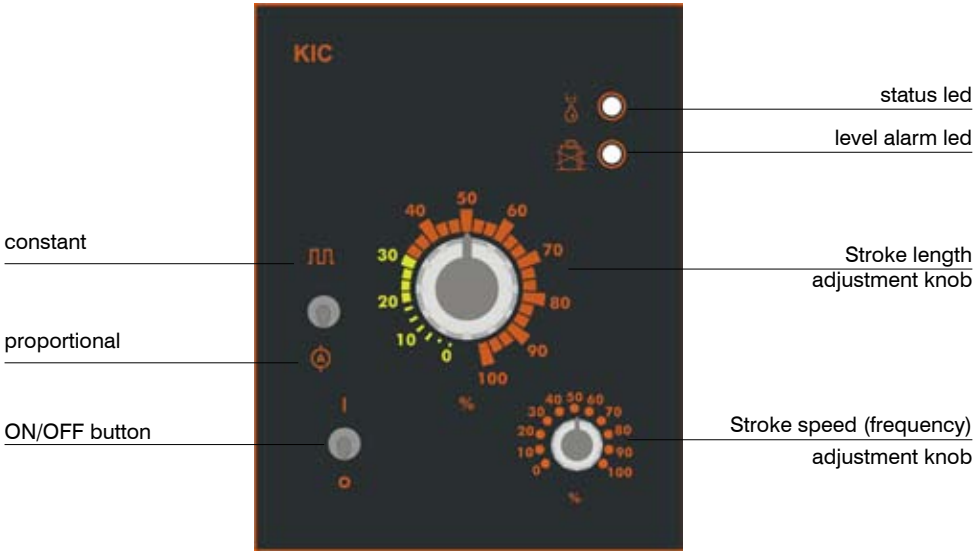
It flashes 3 times per second	the pump is powered with a power supply lower than the label
It flashes 2 times per second	the pump is powered with a power supply higher than the label
It flashes 1 time every 2 seconds	the pump is in pause (OFF) and it is powered (OFF* mode)
led ON, it switches off when pump strokes	the pump is active and functioning (ON)
led ON, it switches off 1 time every 2 seconds	the pump is working into DIVIDE mode

KIC

Proportional/*constant* pump driven by current signal.
Setting the switch on the *constant* position the pump has stroke speed adjustment between 0 and 100% of indicated capacity (see label on pump type). The % marked knob sets the pump capacity, changing linearly the magnet stroke number per minute. It is strongly suggested to not operate the pump in the range from 0 to 10%, since there is not a linear correlation with the pump stroke speed in that range.
Setting the switch on the *proportional* position the pump capacity is set proportionally to a given analog current signal; a given signal linear change will be followed by a linear change of capacity.
The current signal accepted range is 0÷20 mA (it can be changed upon demand). The maximum pump capacity requested by the maximum input signal is set by the % marked knob. The IC pump can be driven by any electronic device (such as pH-meter, redox-meter, etc) that gives an analog current signal output. This signal must be applied to the bipolar cable provided with the pump, already internal connected, taking care of connections:

- red wire : *positive (+)*
- black wire : *negative (-)*

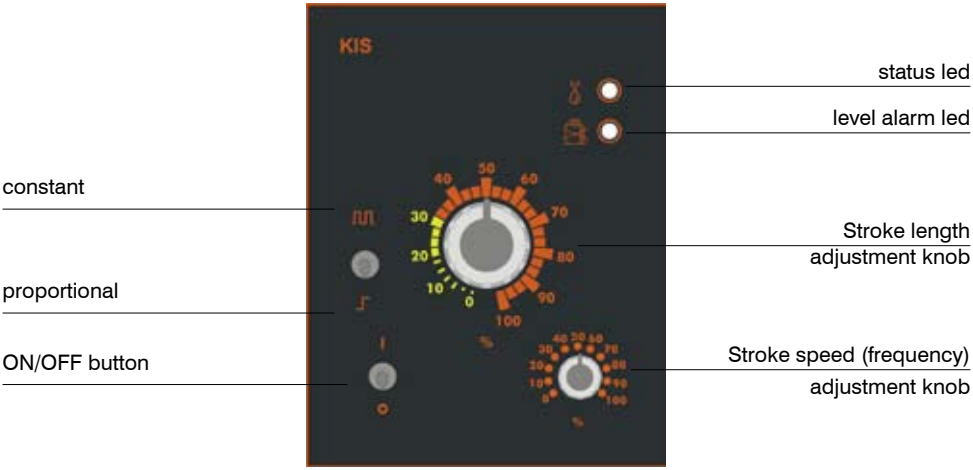


8. Models

KIS

Proportional/*constant* pump driven by a digital signal.
Setting the switch on the *constant* position, the pump has stroke speed adjustment between 0 and 100% of indicated capacity (see label on pump type). The % marked knob sets the pump capacity, changing linearly the magnet stroke number per minute. It is strongly suggested to not operate the pump in the range from 0 to 10%, since there is not a linear correlation with the pump stroke speed in that range.
Setting the switch on the *proportional* position, to each external voltage free pulse correspond a magnet stroke. When proportional position is set, the % marked knob does NOT affect the pump capacity. IS proportional dosing pump can be driven by any external device (PCs, PLCs, etc) that produce a digital signal. The digital signal (N.O. contact) must be applied to the cable provided with the pump, already internal connected. If the digital signal is produced by an “Open Collector” transistor take care of connections:

- red wire : *positive (+)*
- black wire : *negative (-)*



KPV

Proportional/*constant* pump driven by a water meter digital signal.
Setting the switch on the *constant* position, the pump has stroke speed adjustment between 0 and 100% of indicated capacity (see label on pump type). The % marked knob sets the pump capacity, changing linearly the magnet stroke number per minute. It is strongly suggested to not operate the pump in the range from 0 to 10%, since there is not a linear correlation with the pump stroke speed in that range. It is furthermore possible to divide the maximum magnet strokes per minute by 1, 10 and 100 using the switch on the front panel.
Setting the switch on the *proportional* position, to each external pulse correspond one pump stroke. This pump can be driven by a CTFI or CWFI series water meters. This pump can also be driven by a digital signal coming from a voltage free contact. Driving signal is applied on the BNC plug on the left of the bottom pump cover. Dividing factor (N) value is obtained multiplying the indicated value on the adjustment knob by the multiplying switch (x1, x10, x100) value.

Capacity definition for "KPV" pump

Given the water m^3 to be treated and the product amount to dose in p.p.m., the minimum pump capacity to be used can be obtained with the following formula:

$$\frac{ppm \times K \times m^3}{1000} = l/h$$

l/h - minimum pump capacity required
ppm - product amount to dose in p.p.m. (gr/m^3)
k - dosed product dilution factor (pure chemical k=1)
m^3 - maximum capacity of the system to be treated in m^3 /h.

Dividing factor (N) to be set on the adjustment knob is given by the following formula:

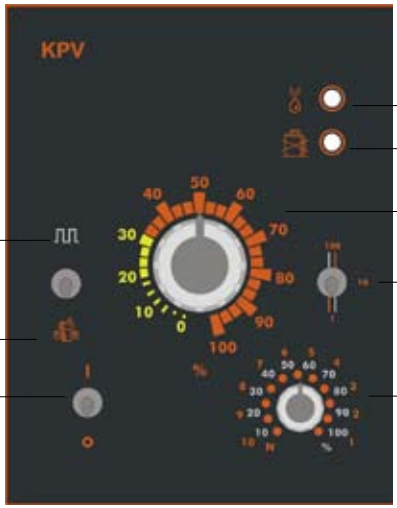
$$\left(\frac{imp/l \times cc}{ppm \times K}\right) \times 1000 = N$$

N - is the number the external pulses are divided by to be set on the adjustment knob
imp/l- pulse per liter given by the water meter
cc - pump's single stroke dosing quantity (in cc). Refer to following table
k - dosed product dilution factor (pure chemical k=1)
*ppm** - product amount to dose in p.p.m. (gr/m^3)
* 10.000 ppm equals to 1%

8. Models

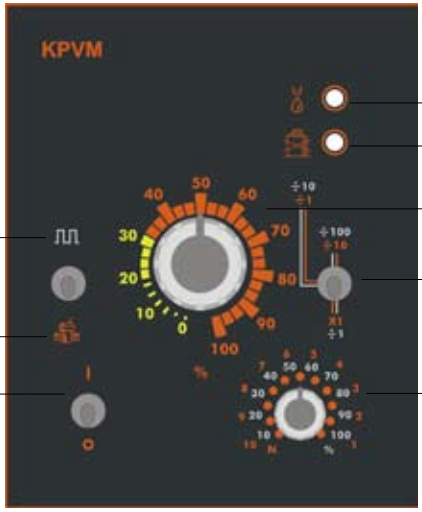
Modello	*cc*
2001	0.1
1802	0.19
1504	0.37
1005	0.46
0808	0.76
0510	0.93
0218	0.5

If the dividing factor (N), obtained with the above formula, is <1, a pump with higher single stroke dosing quantity is required or the water meter needs to be changed with one that gives higher number of pulses per liter. In some application this issue can be solved reducing the dosed product dilution factor. If dosed amount is higher than the needed one, the set dividing factor (N) can be increased.



KPVM

Proportional/*constant* pump driven by a water meter digital signal.
Setting the switch on the *constant* position, the pump has stroke speed adjustment between 0 and 100% of indicated capacity (see label on pump type). The % marked knob sets the pump capacity, changing linearly the magnet stroke number per minute. It is strongly suggested to not operate the pump in the range from 0 to 10%, since there is not a linear correlation with the pump stroke speed in that range. It is furthermore possible to divide the maximum magnet strokes per minute by 1 (÷1), 10 (÷10) and 100 (÷100) using the switch on the front panel. The electronic capacity adjustment sets the injection per minute.
Setting the selector on the *proportional* position and the selector on "multiplier" (X1), the pump gives a stroke each 10 external pulses sent. Setting the selector on "divider" (÷1 or ÷10), the pump gives at maximum a stroke each external pulse sent and at minimum a stroke each 100 pulses sent. This pump can be driven by a CTFI or CWFI series water meters. This pump can also be driven by a digital signal coming from a voltage free contact. Driving signal is applied on the BNC plug on the left of the bottom pump cover.



9. Priming

PRIMING

On the pump head there is a discharge hose (left side).

To prime the pump without touching the chemical proceed as follow:

1. connect the transparent hose to the discharge hose and insert its end into the chemical tank;

2. open the discharge valve turning the knob;

3. turn on the pump and set the stroke lenght adjustment knob on 100% and the stroke speed (frequency) adjustment knob on 100% (between 50% and 70% for high viscosity chemicals).

4. All air inside the pump will exit through the discharge valve. When the chemical begin to flow into discharge hose, close immediately the discharge knob.

If the chemical is particularly dense, to facilitate the priming:

1. turn on the pump and open the discharge valve;

2. insert a 20cc syringe into the discharge hose and suck;

3. when the syringe is near to full, close the discharge valve.

Problem	Possible Cause
Pump doesn't turn on.	*Pump isn't powered. Connect it to main supply.* *Pump's protection fuse is broken. Replace it. See page 26 for replacement procedure.* *Pump's main board is broken. Replace it. See page 26 for replacement procedure.*
Pump is not dosing and solenoid is operating.	*The foot filter is obstructed. Clean it.* *Suction hose is empty. Pump must be primed. Repeat priming procedure.* *Air bubbles inside hydraulic circuit. Check valves - hoses - fittings.* *Product to dose is generating gas. Turn discharge knob and let air flow away.* *Use a self-venting pump head.*
Pump is not dosing and solenoid isn't operating or slightly operating.	*Crystals presence inside valves. Check them and try to dose 2-3 liters of normal water. Change valves.* *Injection valve obstructed. Change it.*

11. Fuse and main board replacement

Fuse or main board replacement is allowed to qualified personnel only. Before to operate disconnect the pump from main power and all hydraulic connections.

For fuse replacement is necessary to use a 3x16 and 3x15 screwdriver and a new fuse (same model of old one).

For main board replacement is necessary to use a 3x16 and 3x15 screwdriver and a new main board (same model of old one).

Fuse replacement procedure:

- Turn pump's injection knob on 0%.

- Remove 6 screws from pump's back.

- Pull pump's back cover until it's completed separated from pump's front. Be careful of the knob's spring.

- Locate the blown fuse and replace it.

- Reassemble the pump. Be careful to put back the knob's spring.

- Reinsert screws.

Main board replacement procedure:

- Turn pump's injection knob on 0%.

- Remove 6 screws from pump's back.

- Pull pump's back cover until it's completed separated from pump's front. Be careful of the knob's spring.

- Remove board's screws.

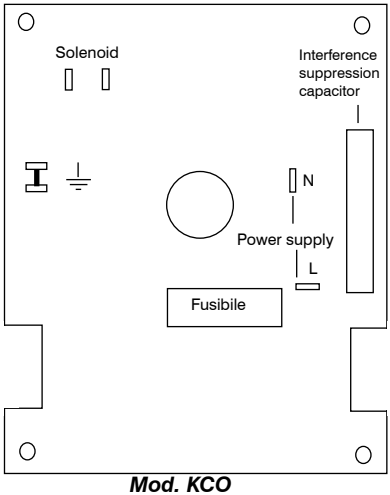
- Completely disconnect wires from main board and replace it. Reinsert screws.

- Reconnect wires to the main board (see enclosed picture).

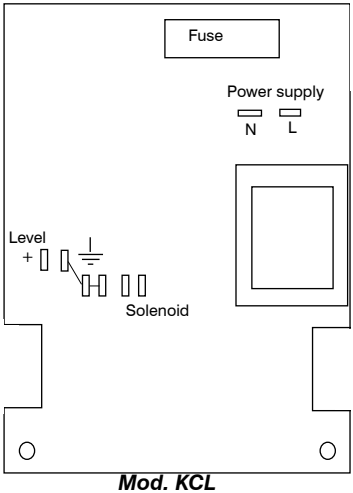
- Reassemble the pump. Be careful to put back the knob's spring.

- Reinsert screws.

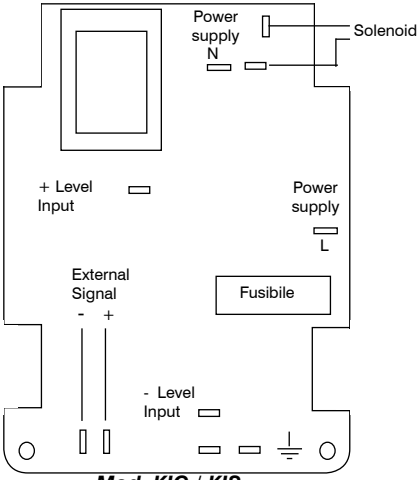
Model Pump "K"	*Fuse (Power supply 230 VAC)*	*Fuse (Power supply 115 VAC)*
Kxx 2001	1A T	500mA T
Kxx 1802	1A T	500mA T
Kxx 1504	1A T	500mA T
Kxx 1005	1A T	500mA T
Kxx 0808	1A T	500mA T
Kxx 0510	1A T	500mA T
Kxx 0218	1A T	500mA T



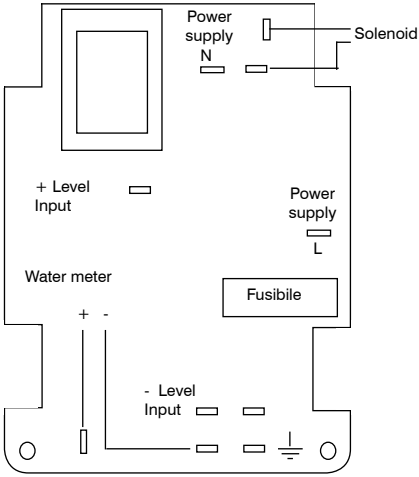
Mod. KCO



Mod. KCL



Mod. KIC / KIS



Mod. KPV / KPVM

A Appendix. Maintenance.

During normal operating mode, pump must be checked once for month. Wear needed safety devices and check hoses and all hydraulic components for:

- product leak
- broken hoses
- corroded connections

All maintenance operations must be performed by authorized and trained personnel only. If pump needs factory assistance please use original package to return it.

Before to do it, please, remove all dosing product inside the pump and hoses.

Use only original spare parts!

TECHNICAL FEATURES

Power supply:	230 VAC (190-265 VAC)
Power supply:	115 VAC (90-135 VAC)
Power supply:	24 VAC (20-32 VAC)
Power supply:	12 VDC (10-16 VDC)
Pump Strokes:	0 ÷ 180
Suction Height:	1,5 metres
Environment Temperature:	0 ÷ 45°C (32 ÷ 113°F)
Chemical Temperature:	0 ÷ 50°C (32 ÷ 122°F)
Installation Class:	II
Pollution Level:	2
Audible Noise:	74dbA
Packaging and Transporting Temperature:	-10÷+50°C (14 ÷ 122°F)
Protection degree:	IP 65

MANUFACTURING MATERIALS

Case:	PP
Pump head:	PVDF, Acrylic, SS *
Diaphragm:	PTFE
Balls:	CERAMIC, PTFE, SS *
Suction Pipe	PVC
Delivery Pipe:	PVDF
Valve Body:	PP, PVDF, SS *
O-ring:	FP, EP, PTFE *
Injection connector	PVDF (ceramic, HASTELLOY C276 spring)
Level Probe:	PVDF *
Level probe cable:	PE
Foot Filter:	PVDF

***as ordered.**

INFORMATION								
	Flow				**cc per stroke**		**max pressure**	
	Min cc/h	**Max l/h**	**Min GPH**	**Max GPH**	**Min**	**Max**		
2001	29.16	1	0.008	0.26	0.03	0.09	20 bar	290 PSI
1802	61.56	2	0.016	0.53	0.06	0.19	18 bar	261 PSI
1504	118.8	4	0.031	1.06	0.11	0.37	15 bar	217 PSI
1005	151.2	5	0.040	1.32	0.14	0.46	10 bar	145 PSI
0808	237.6	8	0.063	2.11	0.22	0.74	8 bar	116 PSI
0510	302.4	10	0.080	2.64	0.28	0.93	5 bar	72 PSI
0218	540	18	0.143	4.76	0.50	1.67	2 bar	29 PSI
INFORMATION SELF VENTING MODELS								
1801	29.16	1	0.008	0.26	0.03	0.09	18 bar	261 PSI
1503	86.4	3	0.023	0.79	0.08	0.28	15 bar	217 PSI
103,5	108	3.5	0.029	0.92	0.10	0.32	10 bar	145 PSI
085,5	162	5,5	0.043	1.45	0.15	0.51	8 bar	116 PSI
057,5	226.8	7.5	0.060	1.98	0.21	0.69	5 bar	72 PSI
0213	399.6	13	0.106	3.43	0.37	1.20	2 bar	29 PSI

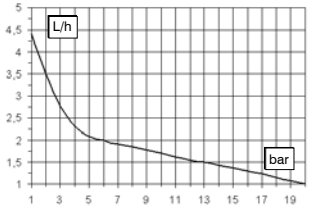
C Appendix. Delivery Curves

Pump head I

20 01

l/h 01

bar 20

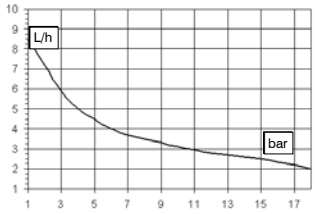


Pump head L

18 02

l/h 02

bar 18

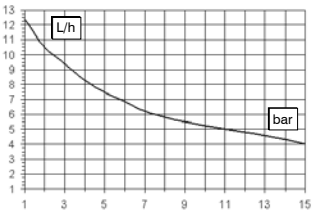


Pump head L

15 04

l/h 04

bar 15

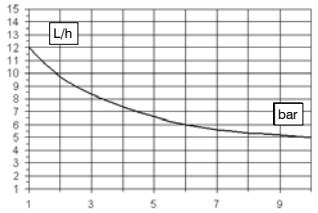


Pump head L

10 05

l/h 05

bar 10

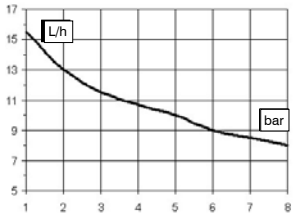


Pump head L

08 08

l/h 08

bar 08

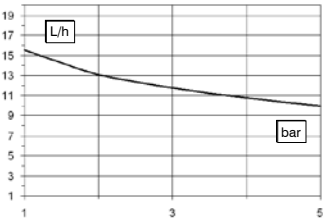


Pump head L

05 10

l/h 10

bar 05

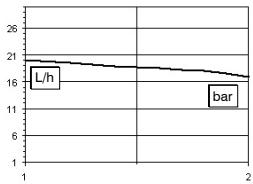


Pump head M

02 18

l/h 18

bar 02



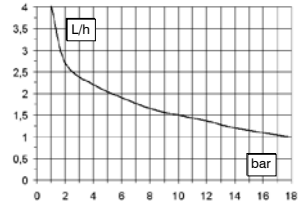
Flow rate indicated is for H_2O at 20°C at the rated pressure. Dosing accuracy ± 2% at constant pressure ± 0,5 bar.

Pump head LA

18 01

l/h 01

bar 18

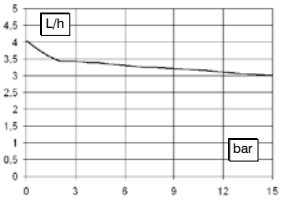


Pump head LA

15 03

l/h 03

bar 15

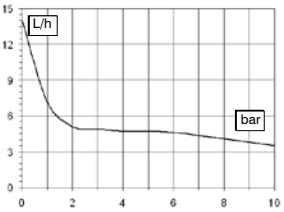


Pump head LA

10 3.5

l/h 3.5

bar 10

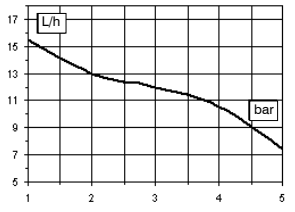


Pump head LA

05 7.5

l/h 7.5

bar 05

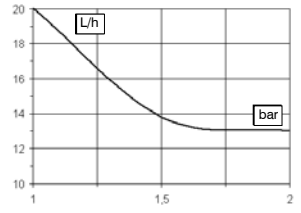


Pump head MA

02 13

l/h 13

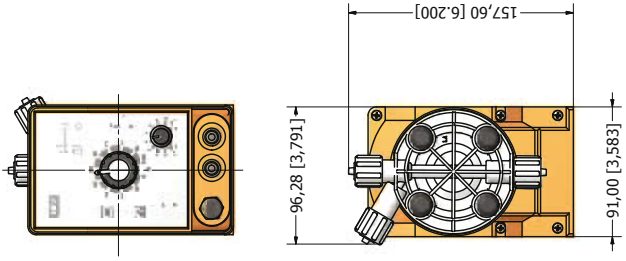
bar 02

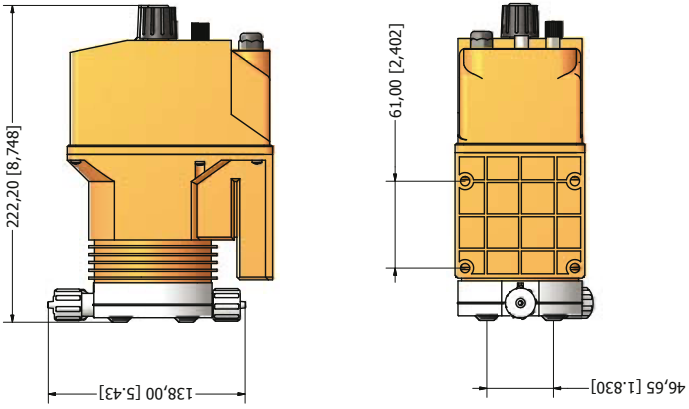


Flow rate indicated is for H_2O at 20°C at the rated pressure. Dosing accuracy ± 2% at constant pressure ± 0,5 bar.

bold : mm
( ) : inches

Dimensions





Solenoid driven metering pumps are widely used to dose chemical fluids and it is important that the most suitable material in contact with fluid is selected for each application. This compatibility table serves as a useful help in this respect. All the informations in this list are verified periodically and believed to be correct on the date of issuance. All the informations in this list are based on manufacturer's data and its own experience but since the resistance of any material depends by several factors this list is supplied only as an initial guide, in no way EMEC makes warranties of any matter respect to the informations provided in this list.

Product	Formula	Ceram.	PVDF	PP	PVC	SS 316	PMMA	Hastel.	PTFE	FPM	EPDM	NBR	PE
Acetic Acid, Max 75%	CH3COOH	2	1	1	1	1	3	1	1	3	1	3	1
Hydrochloric Acid, Concentrate	HCl	1	1	1	1	3	1	1	1	1	3	3	1
Hydrofluoric Acid 40%	H2F2	3	1	1	2	3	3	2	1	1	3	3	1
Phosphoric Acid, 50%	H3PO4	1	1	1	1	2	1	1	1	1	1	3	1
Nitric Acid, 65%	HNO3	1	1	2	3	2	3	1	1	1	3	3	2
Sulphuric Acid, 85%	H2SO4	1	1	1	1	2	3	1	1	1	3	3	1
Sulphuric Acid, 98.5%	H2SO4	1	1	3	3	3	3	1	1	1	3	3	3
Amines	R-NH2	1	2	1	3	1	-	1	1	3	2	3	1
Sodium Bisulphite	NaHSO3	1	1	1	1	2	1	1	1	1	1	1	1
Sodium Carbonate (Soda)	Na2CO3	2	1	1	1	1	1	1	1	2	1	1	1
Ferric Chloride	FeCl3	1	1	1	1	3	1	1	1	1	1	1	1
Calcium Hydroxide (Slaked Lime)	Ca(OH)2	1	1	1	1	1	1	1	1	1	1	1	1
Sodium Hydroxide (Caustic Soda)	NaOH	2	1	1	1	1	1	1	1	2	1	2	1
Calcium Hypochlor.(Chlor.ted Lime)	Ca(OCl)2	1	1	1	1	3	1	1	1	1	1	3	1
Sodium Hypochlorite, 12.5%	NaOCl + NaCl	1	1	2	1	3	1	1	1	1	1	2	2
Potassium Permanganate, 10%	KMnO4	1	1	1	1	1	1	1	1	1	1	3	1
Hydrogen Peroxide, 30% (Perydrol)	H2O2	1	1	1	1	1	3	1	1	1	2	3	1
Aluminium Sulphate	Al2(SO4)3	1	1	1	1	1	1	1	1	1	1	1	1
Copper-II-Sulphate (Roman Vitriol)	CuSO4	1	1	1	1	1	1	1	1	1	1	1	1

Resistance rating

Resistant	1
Fairly resistant	2
Not resistant	3

Materials

Polyvinyldene fluoride	PVDF	Pump Heads, valves, fitting, tubing
Polypropylene	PP	Pump Heads, valves, fitting, level floater
PVC	PVC	Pump Heads
Stainless steel	SS 316	Pump Heads, valves
Polymethyl Metacrilate (Acrylic)	PMMA	Pump Heads
Hastelloy C-276	Hastelloy	Injection valve spring
Polytetrafluoroethylene	PTFE	Diaphragm
Fluorocarbon (Viton® B)	FPM	Sealings
Ethylene propylene	EPDM	Sealings
Nitrile	NBR	Sealings
Polyethylene	PE	Tubing

F Appendix. Hoses resistance table

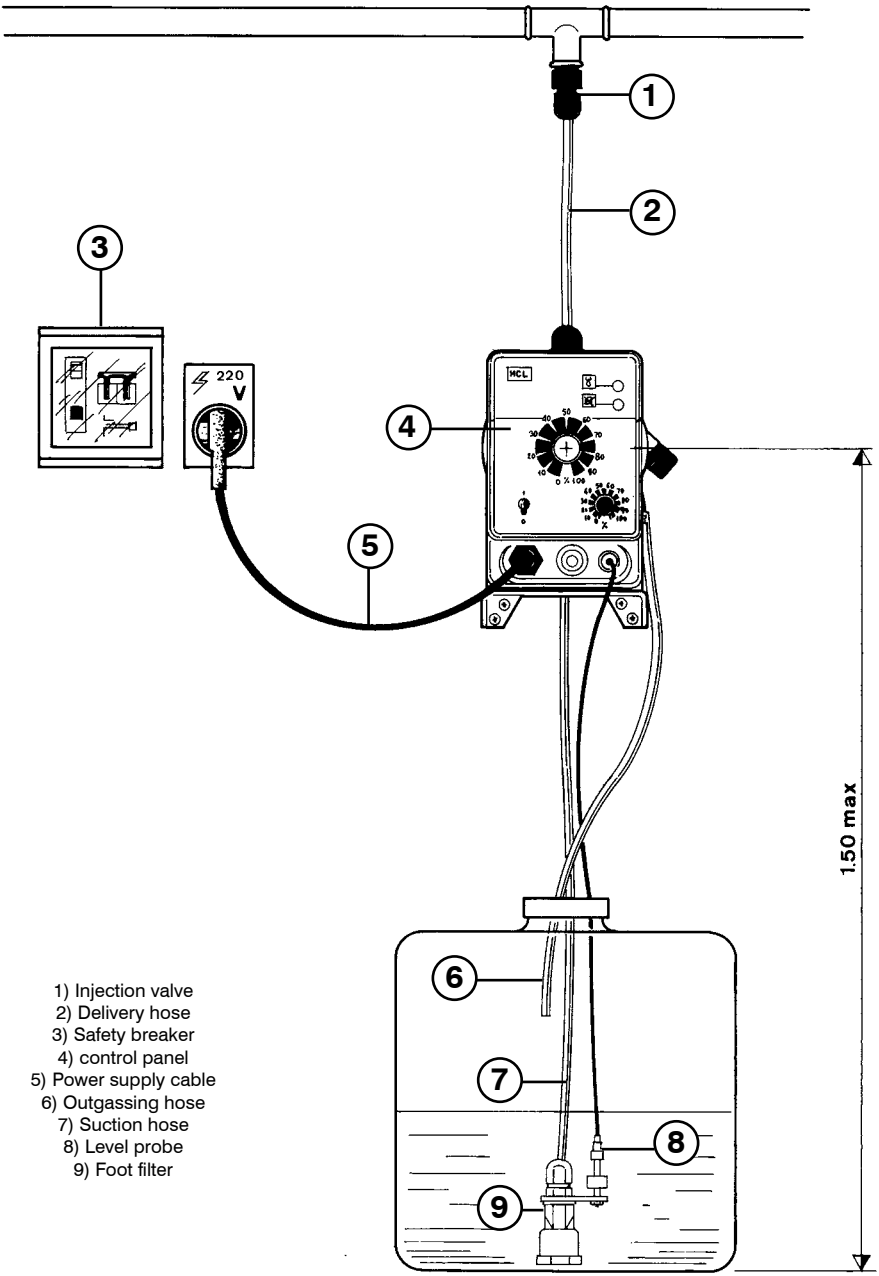
Hose features are very important for a reliable dosage. Every pump's model is made to work in the best way using selected hoses according to pump's capacity / model. Information reported here are intended for standard use only. For extended information ask to hose's manufacturer.

Suction / Delivery Hose			
4x6 mm PVC (transparent)	4x8 mm PE (opaque)	6x8 mm PE (opaque)	8x12 mm PVC (transparent)

Delivery Hose	Working Pressure				Breaking Pressure			
4x6 mm PE 230 (opaque)	20°C 12 bar	30°C 10.5 bar	40°C 8.5 bar	50°C 6.2 bar	20°C 36 bar	30°C 31.5 bar	40°C 25.5 bar	50°C 18.5 bar
4x8 mm PE 230 (opaque)	20°C 19 bar	30°C 15.7 bar	40°C 12 bar	50°C 7.5 bar	20°C 57 bar	30°C 47 bar	40°C 36 bar	50°C 22.5 bar
6x8 mm PE 230 (opaque)	20°C 8.6 bar	30°C 6.8 bar	40°C 4.8 bar	50°C 2.3 bar	20°C 26 bar	30°C 20.5 bar	40°C 14.5 bar	50°C 7 bar
8x12 mm PE 230 (opaque)	20°C 12 bar	30°C 10.5 bar	40°C 8.5 bar	50°C 6.2 bar	20°C 36 bar	30°C 31.5 bar	40°C 25.5 bar	50°C 18.5 bar

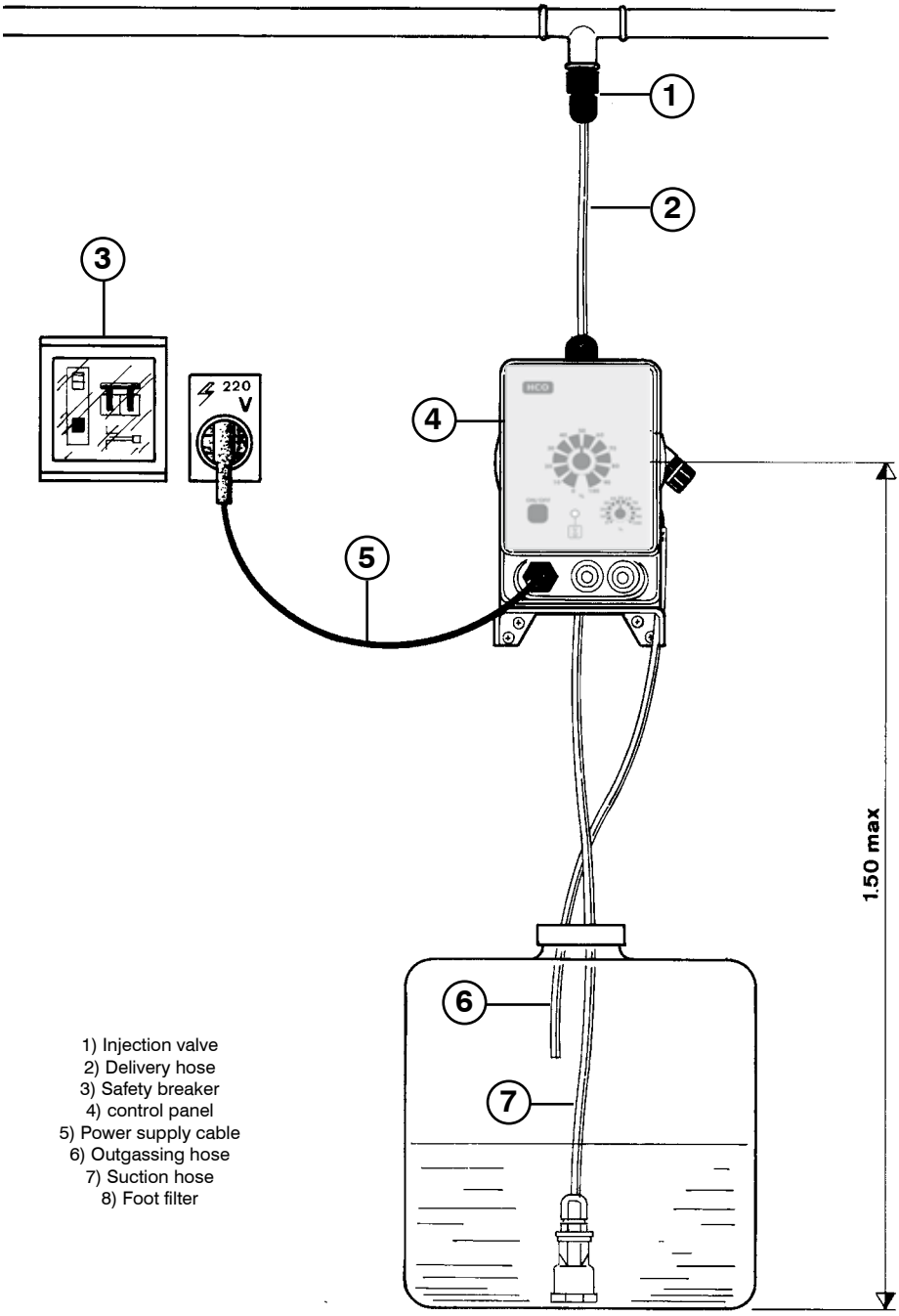
4x6 mm PVDF Flex 2800 (opaque)	20°C 40 bar	30°C 34 bar	40°C 30 bar	50°C 27 bar	60°C 24.8 bar	80°C 20 bar	90°C 10 bar
6x8 mm PVDF Flex 2800 (opaque)	20°C 29 bar	30°C 25.5 bar	40°C 22 bar	50°C 20 bar	60°C 18 bar	80°C 14.5 bar	90°C 7.3 bar
8X10 mm PVDF Flex 2800 (opaque)	20°C 18 bar	30°C 15.5 bar	40°C 13.5 bar	50°C 12.5 bar	60°C 11.2 bar	80°C 9 bar	90°C 4.5 bar

1/4 PE 230 (opaque)	20°C 17.6 bar
3/8 PE 230 (opaque)	20°C 10.6 bar
1/2 PE 230 (opaque)	20°C 10.6 bar

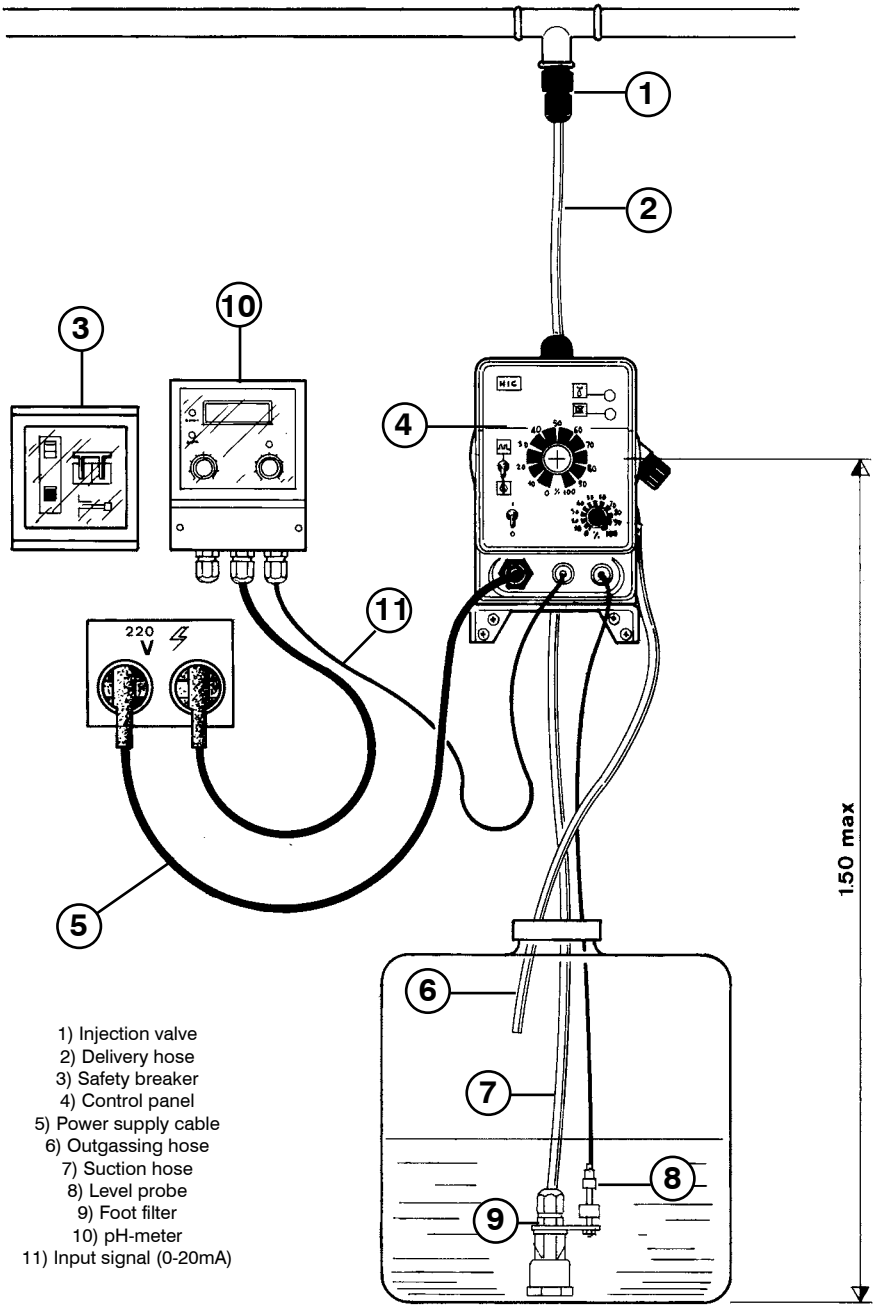


1) Injection valve
2) Delivery hose
3) Safety breaker
4) control panel
5) Power supply cable
6) Outgassing hose
7) Suction hose
8) Level probe
9) Foot filter

G Appendix. “KCO” Installation drawing

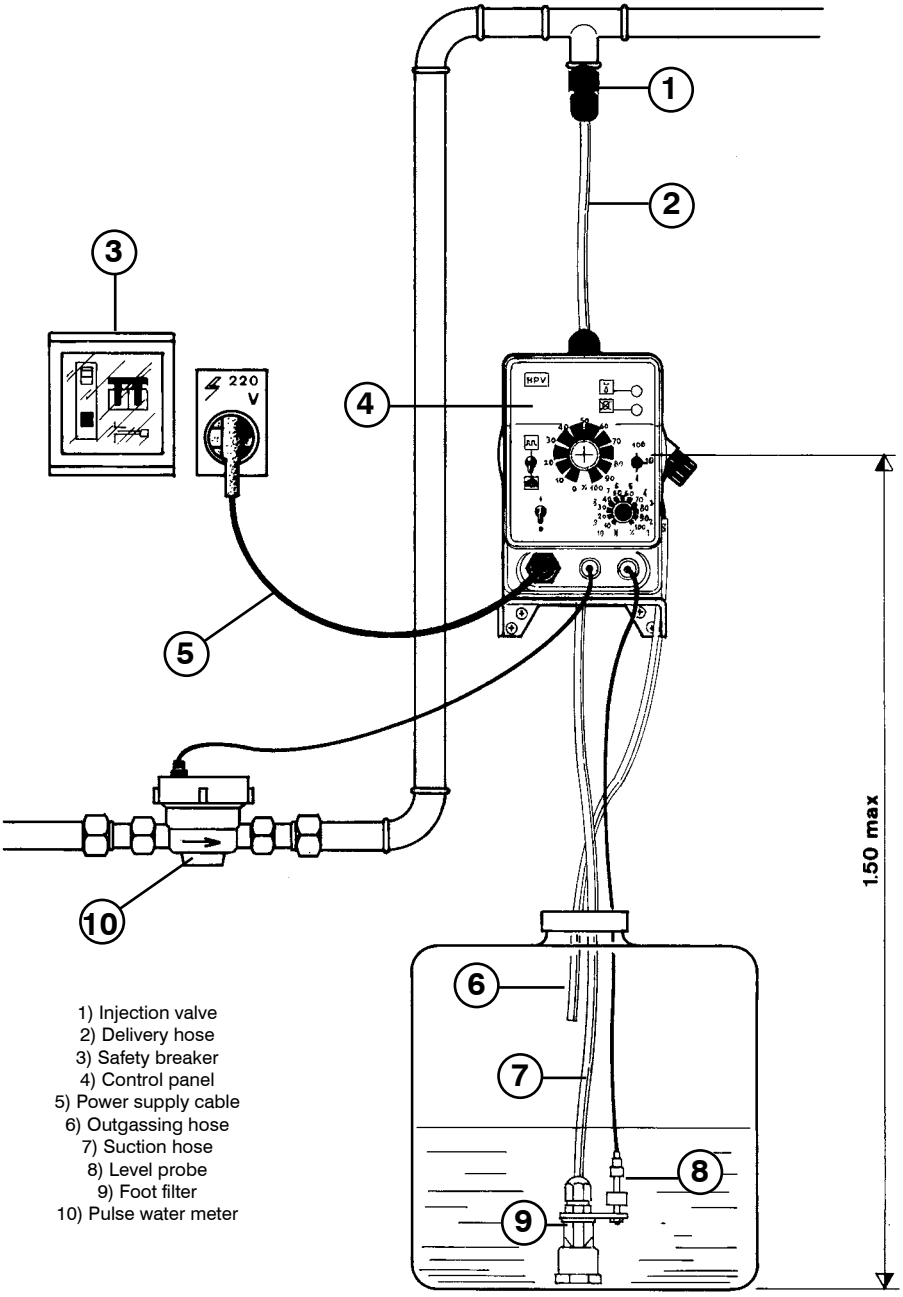


1) Injection valve
2) Delivery hose
3) Safety breaker
4) control panel
5) Power supply cable
6) Outgassing hose
7) Suction hose
8) Foot filter

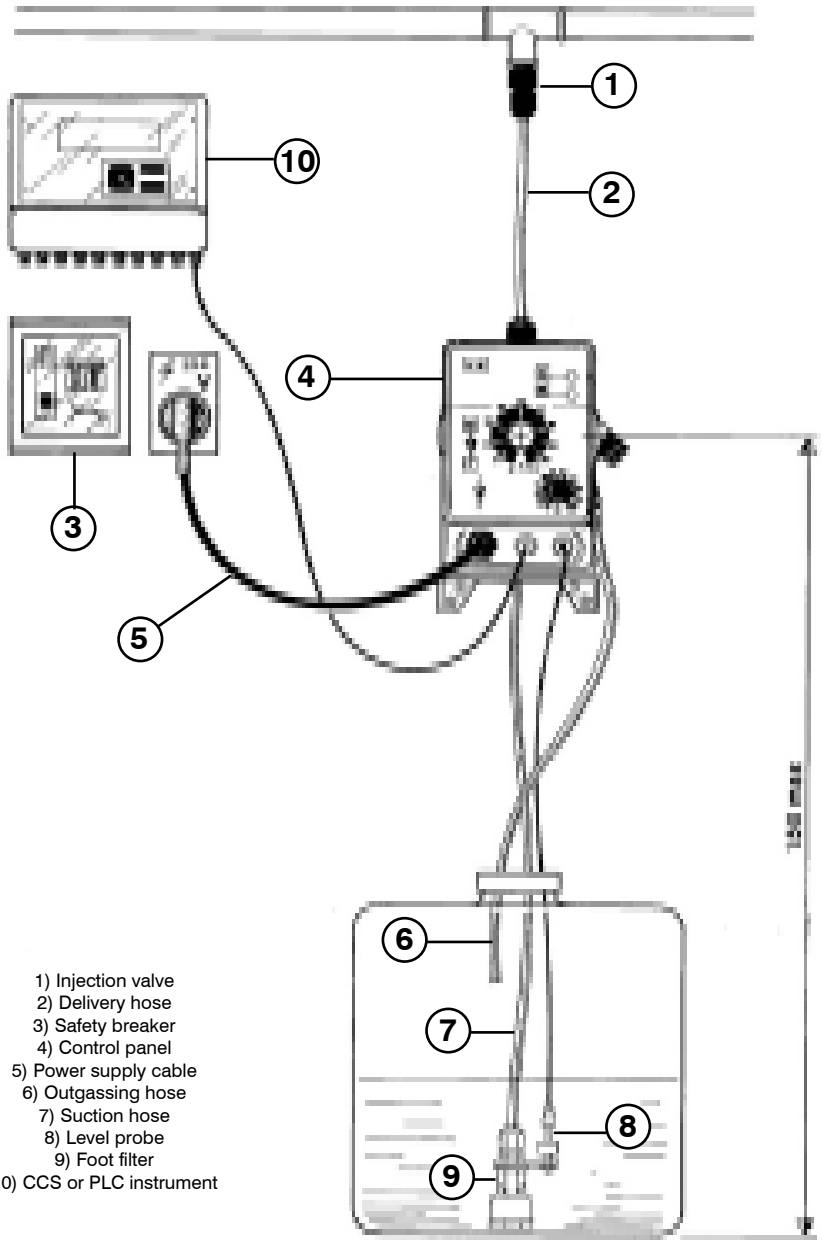


1) Injection valve
2) Delivery hose
3) Safety breaker
4) Control panel
5) Power supply cable
6) Outgassing hose
7) Suction hose
8) Level probe
9) Foot filter
10) pH-meter
11) Input signal (0-20mA)

G Appendix. “KPV” Installation drawing

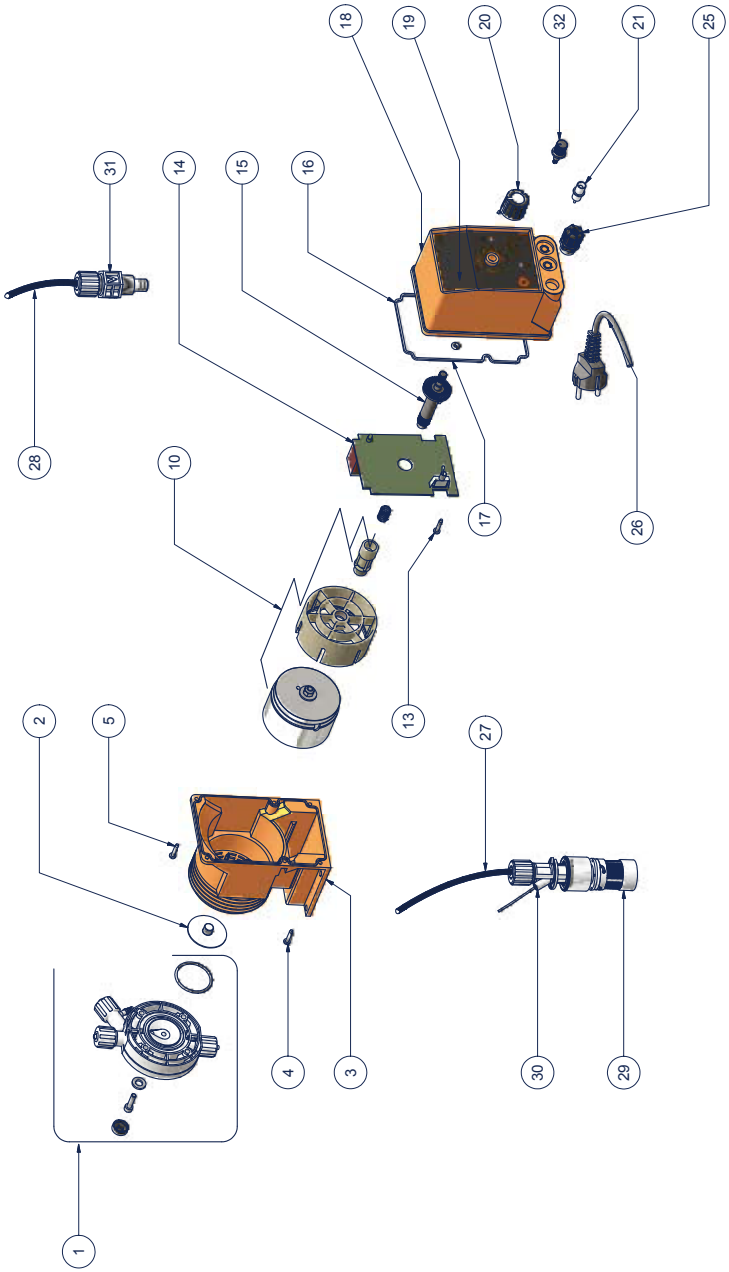


1) Injection valve
2) Delivery hose
3) Safety breaker
4) Control panel
5) Power supply cable
6) Outgassing hose
7) Suction hose
8) Level probe
9) Foot filter
10) Pulse water meter



1) Injection valve
2) Delivery hose
3) Safety breaker
4) Control panel
5) Power supply cable
6) Outgassing hose
7) Suction hose
8) Level probe
9) Foot filter
10) CCS or PLC instrument

H appendix. Exploded view



NOTICE: always specify the pump's label when ordering spare parts.

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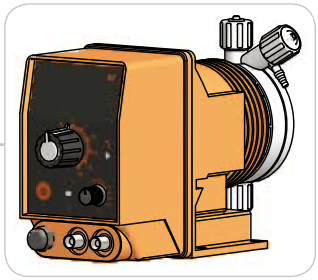

When dismantling a pump please separate material types and send them according to local recycling disposal requirements.
We appreciate your efforts in supporting your local Recycle Environmental Program.
Working together we'll form an active union to assure the world's invaluable resources are conserved.